

AMENDMENTS TO THE CLAIMS

1. (Canceled)
2. (Currently Amended) An optical system comprising a A
microlithographic reduction projection catadioptric objective having an object side and an image side and a plurality of curved mirrors, wherein directly after a most imageward curved mirror the beam diverges.
3. (Previously Presented) A microlithographic reduction projection catadioptric objective having an image side and an object side and curved mirrors and being devoid of planar folding mirrors, comprising an aperture plane on the image side of a most imageward curved mirror and comprising 4 curved mirrors and more than 8 lenses.
4. (Previously Presented) A microlithographic reduction projection catadioptric objective having a system that is free of central obscuration of an aperture, comprising a plurality of optical elements and having a straight axis of symmetry of all curvatures of all optical elements, wherein no more than two optical elements deviate substantially from disk form.
5. (Original) The microlithographic reduction projection catadioptric objective according to claim 3, comprising no more than one optical element that is in a substantially non rotationally symmetric form.
6. (Previously Presented) A microlithographic reduction projection catadioptric objective having an object side and an image side and curved mirrors and being devoid of planar folding mirrors, comprising an aperture plane on the image side of a most imageward curved mirror, the objective consisting in sequence from the object side to the image side of a catadioptric group providing a real intermediate image, a catoptric or

catadioptric group as a whole providing a virtual image, and a dioptric group providing a real image.

7. (Canceled)
8. (Previously Presented) A microlithographic reduction projection catadioptric objective having an object side and an image side, comprising, in sequence from the object side to the image side, a catadioptric group comprising one curved mirror and having a negative reduction ratio, a group comprising an odd number of curved mirrors and having a positive reduction ratio, and a dioptric lens group having a negative reduction ratio, wherein at least two curved mirrors face one another and are free from any lenses being physically therebetween.
9. (Original) The objective according to claim 6, wherein the catadioptric group comprises a positive field lens group and a negative lens group next to a mirror, and wherein the dioptric lens group comprises more positive than negative lenses.
10. (Original) A microlithographic reduction projection catadioptric objective, having an object side and an image side, comprising an even number greater than two of curved mirrors, with an unobscured system aperture and including more lenses than curved mirrors, being devoid of planar folding mirrors and comprising an aperture plane on the image side of a most imageward curved mirror.
11. (Canceled)
12. (Original) A microlithographic reduction projection catadioptric objective, comprising 4 curved mirrors and more than 8 lenses forming a system with an unobscured pupil, comprising a straight axis of symmetry

- of all curvatures of all optical elements, wherein no more than two optical elements deviate substantially from disk form.
13. (Previously Presented) A microlithographic reduction projection catadioptric objective having an object side and an image side, comprising more than two curved mirrors and no more than one optical element that is in a substantially non rotationally symmetric form, consisting of, in sequence from the object side to the image side, a catadioptric group providing a real intermediate image, a catoptric or catadioptric group providing a virtual image, and a dioptic group providing a real image, wherein a most imageward mirror is convex.
 14. (Currently Amended) The ~~microlithographic reduction projection catadioptric objective optical system~~ according to claim 2, comprising, in sequence from the object side to the image side, a field lens group, a catadioptric group comprising one or more negative lenses and a concave mirror, generating axial chromatic aberration, a group comprising an odd number of mirrors, and a positive lens group.
 15. (Original) The microlithographic reduction projection catadioptric objective according to claim 4 having an object side and an image side, comprising, in sequence from the object side to the image side, a catadioptric group comprising one curved mirror and having a negative reduction ratio, a group comprising an odd number of curved mirrors and having a positive reduction ratio, and a dioptic lens group having a negative reduction ratio.
 16. (Original) The objective according to claim 15, wherein the catadioptric group comprises a positive field lens group and a negative lens group next to the curved mirror, and the dioptic lens group comprises more positive than negative lenses.

17. (Previously Presented) A microlithographic reduction projection catadioptric having an image side and an object side and curved mirrors and being devoid of planar folding mirrors, comprising an aperture plane on the image side of a most imageward curved mirror, wherein the most imageward mirror is convex.
18. (Previously Presented) The objective according to claim 17, further comprising a straight axis of symmetry of all curvatures of all optical elements.
19. (Currently Amended) The ~~microlithographic reduction projection catadioptric objective optical system~~ according to claim 2 comprising an intermediate image, with at least two mirrors being arranged upstream in the path of the beam.
20. (Original) The objective according to claim 6, wherein the image side numerical aperture is NA=0.7 or greater, at an image field of 5 mm x 20 mm to 8 mm x 30 mm.
21. (Previously Presented) The objective according to claim 6, wherein all lenses built in as full disks do not obstruct a beam path.
22. (Original) The objective according to claim 3, comprising at least one spherical mirror.
23. (Original) The objective according to claim 18, wherein the curved mirrors have optical surfaces that comprise sections or full surfaces of revolution.
24. (Original) The objective according to claim 3, comprising, in sequence from an object plane end, a first and a third curved mirror that are concave and a fourth mirror that is convex.

25. (Previously Presented) The objective according to claim 41, comprising an aperture plane located within a catadioptric chromatic aberration generating group comprising at least one negative lens and a concave mirror.
26. (Previously Presented) The objective according to claim 6, comprising a field lens group next to an object plane and being object side telecentric.
27. (Original) The objective according to claim 4, wherein the optical elements comprise lenses that are all located within a cylindrical envelope of minimal radius, and curved mirrors, all but one of the curved mirrors being located within a same envelope.
28. (Previously Presented) Projection exposure apparatus comprising a projection objective according to claim 6, an excimer light source, an illumination system, a reticle handling, positioning and scanning system, and a wafer handling, positioning and scanning system.
29. (Currently Amended) The ~~microlithographic reduction projection catadioptric objective optical system~~ according to claim 2, an excimer light source, an illumination system, a reticle handling, positioning and scanning system, and a wafer handling, positioning and scanning system.
30. (Original) Projection exposure apparatus comprising a projection objective according to claim 4, an excimer light source, an illumination system, a reticle handling, positioning and scanning system, and a wafer handling, positioning and scanning system.
31. (Original) Projection exposure apparatus comprising a projection objective according to claim 6, an excimer light source, an illumination system, a reticle handling, positioning and scanning system, and a wafer handling, positioning and scanning system.

32. (Previously Presented) Projection exposure apparatus comprising a projection objective according to claim 41, an excimer light source, an illumination system, a reticle handling, positioning and scanning system, and a wafer handling, positioning and scanning system.
33. (Original) Projection exposure apparatus comprising a projection objective according to claim 8, an excimer light source, an illumination system, a reticle handling, positioning and scanning system, and a wafer handling, positioning and scanning system.
34. (Original) Projection exposure apparatus comprising a projection objective according to claim 17, an excimer light source, an illumination system, a reticle handling, positioning and scanning system, and a wafer handling, positioning and scanning system.
35. (Previously Presented) A microlithographic reduction projection catadioptric objective having an object side and an image side, comprising more than two curved mirrors and no more than one optical element that is a cut off section of a body of revolution, consisting of, in sequence from the object side to the image side, a catadioptric group providing a real intermediate image, a catoptric or catadioptric group providing a virtual image, and a dioptric group providing a real image.
36. (Previously Presented) The objective of claim 12, wherein no more than one optical element deviates substantially from disk form.
37. (Currently Amended) The ~~microlithographic reduction projection catadioptric objective optical system~~ according to claim 2, comprising, in sequence from the object side to the image side, a field lens group, a catadioptric group comprising one or more negative lenses and a concave

- mirror, generating axial chromatic aberration, a group comprising an odd number of curved mirrors, and a positive lens group.
38. (Currently Amended) The ~~microlithographic reduction projection catadioptric objective optical system~~ according to claim 2, wherein the most imageward mirror is convex.
39. (Previously Presented) The objective of claim 4, having an object side and an image side, wherein a most imageward mirror is convex.
40. (Previously Presented) The objective of claim 6, wherein a most imageward mirror is convex.
41. (Previously Presented) A microlithographic reduction projection catadioptric objective having an object side and an image side, comprising, in sequence from the object side to the image side, a field lens group, a catadioptric group comprising one or more negative lenses and a concave mirror, generating axial chromatic aberration, a group comprising an odd number of curved mirrors, and a positive lens group wherein a most imageward mirror is convex.
42. (Previously Presented) The objective of claim 8, wherein a most imageward mirror is convex.
43. (Previously Presented) The objective of claim 10, wherein the most imageward mirror is convex.
44. (Previously Presented) A microlithographic reduction projection catadioptric objective having an object side and an image side, comprising an even number greater than two of curved mirrors, with an unobscured system aperture and including more lenses than curved

mirrors, wherein after a most imageward curved mirror the beam diverges and wherein the most imageward mirror is convex.

45. (Previously Presented) The objective of claim 12, having an object side and an image side, wherein a most imageward mirror is convex.